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REVIEW ARTICLE

EFFECT OF SUPPLEMENTRY FEED ON MORPHOMETRY AND DIGESTIVE TRACT ENZYMES OF *CATLA CATLA*

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ABSTRACT

The present study is an attempt to investigate the action of supplementary feed on morphometry and digestive tract enzymes of *Catla catla.* Juveniles of healthy fish, *Catla catla* were collected from Fish farm. Fish artificial nutrients were clearly mixed in right proportion and allowed to dry for 24 hrs. Using a standard scale and measuring board, the morphometric characters were analysed. Digestive enzymes such as amylase, protease, invertase, lipase and maltase in both control and treated fish samples were tested adopting the standard methods. The present study showed high digestive enzyme activity in control compared to fishes exposed to all other treatment. Enzyme activity of control fish showed in the following order Protease > Lipase > amylase > Maltase >Invertase. On the other hand, amylase activity of tank C fish sample was increased 50% compared to control tank fish sample. Lipase activity is slightly higher in stomach and mid – gut region of control fish sample, but no activity in the foregut and hindgut sample (all group). Combination food supplement such as soya meal, groundnut cake and wheat show remarkable changes in fish Morphometry and digestive tract enzymes. In this combination of food supplement to be improve growth of fish as well as their routine physiological metabolism.

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INTRODUCTION

In aquaculture nutritional context supplementation food is very essential to recover the deficiency and proper metabolic activity of aquatic animals. Natural pond system provides balanced diet but cultivation in artificial pond required proper food supplementation (Toutou *et al.,* 2016). Supplement feeds to be affect growth rate of fish and rearing in pond. The supplement food to be improves microbial count in the digestive tract and weight of the fish. Feed supplements have attracted considerable attention by feed manufactures as means of improving livestock performance. Hence in this study choose different supplementation to analyze effect on carp fishes. Carp is a very hardy fish, can be breed and reared to maturity under all kinds of conditions, requires no costly food, consuming refuse and other natural products which are otherwise useless, grows rapidly, and if properly cooked has a delicate flavor (Burridge and White, 2000). Rapid growth of the fish to a marketable size is essential to a profitable industry.

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Modern growers have succeeded in producing races that grow to an average weight of two and a half pounds at the end of the third summer and in some tropical countries the rapid growth is even more striking. Additional research efforts are required to authenticate application of supplementary tools used as effective nutrition (Makkar *et al*., 2015).

MATERIALS AND METHODS

Collection and Acclimatization of the fish *Catla catla*

Juveniles of healthy fish, *Catla catla* (weight: average 12 ± 0.5 gms., Length : average 82 ± 2 mm) were collected from the National Fish farm at Manimuthar, Tirunelveli District. The fish were brought to the laboratory immediately and acclimatized under standard laboratory conditions for a period of twenty days (Sprague, 1973).

Fish feed formulation: Fish artificial nutrients were clearly mixed in right proportion and allowed to dry for 24 hrs. Every day 10 gm of the feed was administered to each tank

Tank-A: Just given in powdered form, Tank-B: Nutrient flour – Just given in powdered form,

Tank-C: Prepared flour – Soya meal. 20 gm., Groundnut cake: 25 gm, Wheat :25 gm were taken powdered and mixed with water to get a pellet.

Tank D: Artificial feed – 10 gm).

Analysis of Fish Morphometry: The preliminary study was made to Study the morphometric character of a fish. Using a standard scale and measuring board, the following morph metric characters were taken on a given fish. The total length Measurements are taken from the tip of the snort to the posterior of the cardal fin. Fork length was measured from the tip of the snort to the area of the cardalfin stop. Standard length of fish was measured from the tip of the snort to the base of the cardal fin. Measured from the base to the last tip of the pelvic fin and base to the last tip of the anal fin. Pectoral fin was measured from the base of the fectoral fin to its posterior most tip and snout length was measured from the anterior most tip of the snort to the starting of the slit. Orbital diameter was measured from the anterior end of the eye to the posterior end. Dorsal fin length was measured from the anterior base of the dorsal fin to the posterior most tip of the fin. Caudal fin length was measured from the base of the caudal fin to the tip and Post orbital length measurement from the posterior end of the orbital to the dorsal tip of the gill cover notch. The weight of the fish is recorded by using an electrical balance.

Qualitative assessment of digestive enzymes of fish *Catla catla*: The for-gut, stomach, midgut and hindgut of control and food supplementary treated (Food 1, 2, 3, 4) fish samples were dissected out carefully and homogenized. Digestive enzymes such as amylase, protease, invertase, lipase and maltase in both control and treated fish samples were tested adopting the standard methods of Graham (1932).

RESULTS

In the present investigation the Morphometry analysis using a standard scale and measuring board were taken on a given fish and recorded Table 1.

Table 1. Morphemetry analysis of fish in various foodsupplementaion tanks length wise

S.No	Details	Measurements Of Tanks (cm)			
		Tank A	Tank B	Tank C	Tank D
1.	Standard length	6.5	605	7	7
2.	Fork length	8	7	7.5	7.9
3.	Total length	10	8	9	9
4.	Snout length	2.5	2.2	2.7	3
5.	Pre orbital length	1	1	0.8	0.6
6.	Eye diameter	1.7	2	1	0.7
7.	Length of dorsal fin	1.7	1	1.5	1.9
8.	Length of caudal fin	2.3	1.9	1.9	2
9.	Length of pectoral fin	1.2	1.5	1	1.2
10.	Length of ventral fin	1.4	1	1.4	1.5
11.	Length of anal fin	1	0.5	0.9	1
12.	Weight of the fish (gm)	8.142	6.792	8.500	7.537

Tank C and D values showed to resemblance of control fish values. Mixed combination food supplementation provides good effect to Morphometry of fish samples.

The present study showed high digestive enzyme activity in control compared to fishes exposed to all other treatment. Enzyme activity of control fish showed in the following order Protease > Lipase > amylase > Maltase >Invertase. Quantitative analysis of digestive enzyme extracted from *Catla catla* after exposure of different food supplement. Were given in Table 2.

Table 2. Quantitative analysis of digestive enzyme extracted from *Catla catla* after exposure of different food supplement

Digestive Enzyme	Control	Feed-1	Feed-2	Feed-3	Feed-4
Amylase (g/Kg)	1.2 ± 0.4	1.6 ± 0.5	1.2 ± 0.6	1.8 ± 0.4	1.2 ± 0.6
Maltase (g/Kg)	1.1 ± 0.3	1.2 ± 0.6	1.3 ± 0.6	1.2 ± 0.4	1.3 ± 0.2
Invertase (g/Kg)	0.9 ± 0.6	1. ± 0.4	1.1 ± 0.3	1.0 ± 0.3	1.0 ± 0.5
Protease (g/Kg)	1.8 ± 0.6	1.6 ± 0.3	1.2 ± 0.2	2.4 ± 0.6	1.2 ± 0.4
Lipase (g/Kg)	1.3 ± 0.6	1.3 ± 0.6	1.3 ± 0.6	1.3 ± 0.6	1.3 ± 0.6

DISCUSSION

The present study showed high digestive enzyme activity in treated (Tank 3) fish to compared control fish *Catla catla.* On the other hand, amylase activity of tank C fish sample was increased 50% compared to control tank fish sample. Lipase activity is slightly higher in stomach and mid – gut region of control fish sample, but no activity in the foregut and hindgut sample (all group). The protease activity has increased in tank C treated fish sample and no activity in food B and D treated fish when compared to control fish sample. After tank 3, invasion, and initial increase of glucose content may be due to an increase in some digestive enzyme activity. The decrease in glucose level after longer exposure is probably due to the less secretion of hormones, enzymes and inhibition of enzyme activity, which are responsible for the carbohydrate digestion (Desdevises, 2001). It is widely accepted that plants, animals and their by – products used as a source of folk or traditional medicine indicate the presence of a biologically active constituent(s) in them. A significant portion of the currently available non-synthetic and semi synthetic pharmaceuticals in clinical use is comprised of drugs derived from plants, animals, microbial, and mineral products. However many animals have been methodologically tested by pharmaceutical companies as sources of drugs to the modern medical science (Singh and Chaudhary, 2010). Approximately 109 animals and their 270 uses are reported in folk medicine in different part of India. The number of animals reported for medicinal purpose in different parts of India is enough to feel a need to discuss on the use of animals and those products, as medicines. In order to stress how important animals were, are and can be as sources of pharmacological substances and discussion modern medical science. Digestive enzymes such as amylase, protease, invertase , lipase, and maltase in both control and treated fish samples were tested adopting the standard methods of Graham (1932). From the results it's being evident that the gut possesses various enzymes that are beneficial to protect *Catla catla* from pathogenic strains.

Conclusion

From the investigation the growth of fish and their changes were influenced by the supplementation of food. Combination food supplement such as soya meal, groundnut cake and wheat show remarkable changes in fish Morphometry and digestive tract enzymes. In this combination of food supplement to be improve growth of fish as well as their routine physiological metabolism.

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